

1. A method of behavior recognition, comprising the steps of:
 - analyzing a gesture-making target utilizing a plurality of gesture-recognition modules, each outputting information relating to target location and gesture type;
 - designating certain target locations and gesture types as predefined behaviors;
 - comparing the information from the gesture-recognition modules to the predefined behaviors; and
 - in the event of a correlation between the output of the gesture-recognition modules and a particular predefined behavior, determining that the behavior of the target includes the particular gesture.
2. The method of claim 1, wherein the target is a human being.
3. The method of claim 1, wherein the target is a group of people.
4. The method of claim 1, wherein the target is a human hand.
5. The method of claim 1, wherein the gesture-recognition modules output information relating to static and dynamic gestures.
6. The method of claim 5, further including the steps of:

- 6 deriving the start position of the target, the end position of the target, and the
velocity between the start and end positions;
- 8 comparing the velocity of the target to a threshold value; and
 identifying the gesture as a static gesture if the velocity is below the threshold
- 10 value, otherwise,
 identifying the gesture as a dynamic gesture.

7. The method of claim 1, wherein the step of analyzing the gesture-making
2 target includes the use of a velocity damping terms gesture model.

4 8. The method of claim 1, wherein the step of analyzing the gesture-making
target includes imaging the target.

9. The method of claim 8, further including the step of generating a
2 bounding box around the target.

10. The method of claim 8, further including the step of using an operator to
2 find the edges of the target.

11. The method of claim 1, further including the steps of:
2 receiving a file of recognized gestures along with their vector descriptions; and

comparing the outputs of the gesture recognition modules to the vector

4 descriptions.

12. The method of claim 1, further including the step of treating a gesture as a
2 dynamic gesture comprising one or more one-dimensional oscillations.

13. The method of claim 12, further including the step of treating a circular
2 motion as a combination of repeating motions in two dimensions having the same
magnitude and frequency of oscillation.

14. The method of claim 12, further including the step of deriving complex
2 dynamic gestures by varying phase relationships.

15. The method of claim 12, further including the step of deriving a multi-
2 gesture lexicon based upon clockwise and counter-clockwise large and small circles and
one-dimensional lines.

16. The method of claim 12, further including the step of comparing to the
2 next position and velocity of each gesture to one or more predictor bins to determine a
gesture's future position and velocity.

17. The method of claim 16, further including the use of a linear-with-offset-
2 component model to discriminate among simple dynamic gestures.

18. The method of claim 16, further including the use of a velocity damping
2 model to discriminate among non-circular dynamic gestures.

19. The method of claim 1, wherein the target includes a vehicle.

20. The method of claim 1, wherein the target includes a weapon.

21. The method of claim 1, wherein the target forms part of a robot.

	gesture input		
	slow	medium	fast
slow bin	1.31	1.20	1.37
medium bin	14.1	0.24	1.01
fast bin	424	23.1	0.23

Table 1: Residual Errors of Linear with Offset Component Model.

	gesture input		
	slow	medium	fast
slow bin	1.34	1.26	1.38
medium bin	9.8	0.56	1.17
fast bin	36	1.79	0.1

Table 2: Residual of Van der Pol Model.

	gesture input		
	slow	medium	fast
slow bin	1.3	1.21	1.37
medium bin	14.5	0.22	0.98
fast bin	464	25.7	0.11

Table 3: Residual of Van der Pol with Offset Component Model.

	gesture input		
	slow	medium	fast
slow bin	1.29	1.24	1.37
medium bin	14.6	0.18	1.03
fast bin	249	20.0	0.11

Table 4: Residual of Higher Order Terms Model.

	gesture input		
	slow	medium	fast
slow bin	1.28	136	23.3
medium bin	13.8	0.17	1
fast bin	8770	35.9	0.09

Table 5: Residual of Velocity Damping Model.

	Parameter Values			
	x-theta-1	x-theta-2	y-theta-1	y-theta-2
slow bin	-0.72	149	-0.73	103
medium bin	-16.2	3467	-16.3	2348
fast bin	-99.3	20384	-97.1	12970

Table 6: Parameter Values for Linear Model.

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Table 8: Residual Results for Jumping Jacks Behavior.

	Gesture Input from Sensors 1-5				
	1	2	3	4	5
bin 1	0.034	0.063	0.079	0.044	0.04
bin 2	0.27	0.033	0.038	0.044	0.035
bin 3	0.382	0.031	0.029	0.039	0.034
bin 4	9.5	0.081	0.111	0.031	0.072
bin 5	0.258	0.04	0.074	0.038	0.033

Table 9: Residual Results for Walking Behavior.

	Gesture Input from Sensors 1-5				
	1	2	3	4	5
bin 1	0.035	1008	1.24	885	150
bin 2	0.71	0.035	0.054	0.21	11.6
bin 3	0.075	0.906	0.034	5.94	7.12
bin 4	0.05	0.04	0.05	0.033	0.102
bin 5	0.051	0.047	0.052	0.041	0.034

Table 10: Residual Results for Running Behavior.

	Gesture Input from Sensors 1-5				
	1	2	3	4	5
bin 1	0.031	0.207	0.037	0.042	0.041
bin 2	2.00E+16	0.019	6.00E+14	2.00E+16	3.00E+15
bin 3	0.071	0.2	0.034	0.056	0.04
bin 4	0.95	0.2	0.08	0.032	0.035
bin 5	0.28	0.2	0.067	0.039	0.034